

<b>Title</b>	<b>Produce advanced two-dimensional engineering drawings using CAD software</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>8</b>

<b>Purpose</b>	People credited with this unit standard are able to: determine drawing requirements; perform tolerance calculations for drawings; produce and verify advanced two-dimensional (2D) engineering drawings using CAD software; and follow drawing office procedures.
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<b>Classification</b>	Mechanical Engineering > Engineering Drawing and Design
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<b>Available grade</b>	Achieved
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<b>Entry information</b>	
<b>Recommended skills and knowledge</b>	Unit 20802, <i>Produce detailed two-dimensional engineering drawings using CAD software under supervision</i> , or demonstrate equivalent knowledge and skills.

**Explanatory notes**

- 1 Reference  
SAA/SNZ HB1:1995 Joint handbook – *Technical drawing for students*. Available from Standards New Zealand.
- 2 Definitions  
*Advanced engineering drawings*
  - Schematic diagrams, which show a complex array of components and connections in their correct sequence but not necessarily in their correct size or location. Examples may include but are not limited to – proportional hydraulic power system with closed loop control; pneumatic step-counter circuit diagram; duct work, pipe work or control circuit diagrams.
  - Working, assembly drawings in orthographic projection. Examples may include but are not limited to mechanical parts and components such as – jig frame, bevel gear support, mild steel (MS) sleeve bracket, exploded view of vane air motor. Drawings at this level may also include sectioning and auxiliary views.
  - Pattern development, incorporating a mix of single and intersecting surfaces. Examples may include but are not limited to – development of cylinders, cones, breeches of Y pieces, transition pieces.
  - Layout drawings for mechanical services systems, comprising plans and cross-sections drawn to scale to show the physical size, layout and inter-connection of components. Mechanical services systems include but are not limited to heating, ventilating, air-conditioning, and refrigeration systems.

*Accepted industry practice* refers to approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.

*CAD* –computer aided design.

*Assembly* refers to two or more manufactured parts assembled into a complete machine, structure, or unit of a machine.

*Component* refers to individual parts of an assembly in the unfixed state

*Interpretation* – the explanation in practical terms of features shown graphically in the drawing.

*Job specifications* refers to instructions relevant to the safe completion of the specific task, such as technical specifications, assembly instructions, drawings, parts lists, standards, codes of practice, test and commissioning procedures, and verbal instructions.

*Two-dimensional (2D) CAD software* refers to software developed to draw and manipulate objects that have two dimensions (such as width and height) and no thickness.

*Workplace procedures* refer to procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

### 3 Assessment information

- Evidence is required of the production of at least four 2D drawings: two drawings each from two of the categories given in explanatory note 2, using proprietary CAD software.

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## Outcomes and evidence requirements

### Outcome 1

Determine drawing requirements.

#### Evidence requirements

- 1.1 Components and assemblies to be drawn are identified and interpreted from instructions, sketches, finished products or job specifications in accordance with workplace procedures or accepted industry practice.
- 1.2 Drawing end-use requirements are identified, verified, and recorded in accordance with workplace procedures or accepted industry practice.
- Range examples of end-use requirements – print requirements, drawing size.
- 1.3 Required drawing notes are identified to meet construction requirements.
- 1.4 Drawing parameters are selected to meet practical drawing interpretation requirements.
- Range projection, view, scale, layout.

**Outcome 2**

Perform tolerance calculations for drawings.

**Evidence requirements**

- 2.1 Progressive linear and tolerance calculations are undertaken to ensure functional operation of the product.
- 2.2 Geometric tolerances are applied in accordance with the drawing type and job requirements.

**Outcome 3**

Produce advanced two-dimensional engineering drawings using CAD software to meet product construction requirements.

**Evidence requirements**

- 3.1 Components and assemblies are drawn.
- 3.2 Drawings are dimensioned and labelled.
- 3.3 Parts lists or bills of materials are prepared.

**Outcome 4**

Verify advanced two-dimensional engineering drawings.

**Evidence requirements**

- 4.1 Drawings are checked to ensure compliance with job specifications for product construction and functional requirements.
- 4.2 Any non-conformance to job specifications is corrected in accordance with worksite procedures.

**Outcome 5**

Follow drawing office procedures.

**Evidence requirements**

- 5.1 Drawing office procedures are followed in accordance with workplace procedures.  
  
Range drawing register, modification, documentation, issuing, checking.
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<b>Replacement information</b>	This unit standard and unit standard 20803 replaced unit standard 2437, unit standard 2438, and unit standard 2439.
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<b>Planned review date</b>	31 December 2021
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#### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 July 2004	31 December 2011
Rollover and Revision	2	20 March 2009	31 December 2016
Review	3	17 November 2011	31 December 2021
Review	4	15 September 2016	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0013
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

#### Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

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#### Comments on this unit standard

Please contact Competenz [qualifications@competenz.org.nz](mailto:qualifications@competenz.org.nz) if you wish to suggest changes to the content of this unit standard.